



NIH290.001C1 SEQLIST.TXT

SEQUENCE LISTING

<110> Narum, David L.
Sim, Kim L.

<120> ANTI-PLASMODIUM COMPOSITIONS AND METHODS
OF USE

<130> NIH290.001C1

<140> US 10/630,629

<141> 2003-07-29

<150> US 09/924,154

<151> 2001-08-07

<150> US 60/223,525

<151> 2000-08-07

<160> 18

<170> FastSEQ for windows Version 4.0

<210> 1

<211> 1143

<212> PRT

<213> Plasmodium falciparum

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20 25 30
Ile Gly Arg Thr Leu Tyr Asn Arg Gln Asp Glu Ser Ser Asp Ile Ser
35 40 45
Arg Val Asn Ser Pro Glu Leu Asn Asn Asn His Lys Thr Asn Ile Tyr
50 55 60
Asp Ser Asp Tyr Glu Asp Val Asn Asn Lys Leu Ile Asn Ser Phe Val
65 70 75 80
Glu Asn Lys Ser Val Lys Lys Lys Arg Ser Leu Ser Phe Ile Asn Asn
85 90 95
Lys Thr Lys Ser Tyr Asp Ile Ile Pro Ser Tyr Ser Tyr Arg Asn
100 105 110
Asp Lys Phe Asn Ser Leu Ser Glu Asn Glu Asp Asn Ser Gly Asn Thr
115 120 125
Asn Ser Asn Asn Phe Ala Asn Thr Ser Glu Ile Ser Ile Gly Lys Asp
130 135 140
Asn Lys Gln Tyr Thr Phe Ile Gln Lys Arg Thr His Leu Phe Ala Cys
145 150 155 160
Gly Ile Lys Arg Lys Ser Ile Lys Trp Ile Cys Arg Glu Asn Ser Glu
165 170 175
Lys Ile Thr Val Cys Val Pro Asp Arg Lys Ile Gln Leu Cys Ile Ala
180 185 190
Asn Phe Leu Asn Ser Arg Leu Glu Thr Met Glu Lys Phe Lys Glu Ile
195 200 205
Phe Leu Ile Ser Val Asn Thr Glu Ala Lys Leu Leu Tyr Asn Lys Asn
210 215 220
Glu Gly Lys Asp Pro Ser Ile Phe Cys Asn Glu Leu Arg Asn Ser Phe
225 230 235 240
Ser Asp Phe Arg Asn Ser Phe Ile Gly Asp Asp Met Asp Phe Gly Gly
245 250 255
Asn Thr Asp Arg Val Lys Gly Tyr Ile Asn Lys Lys Phe Ser Asp Tyr

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			260					265				270			
Tyr	Lys	Glu	Lys	Asn	Val	Glu	Lys	Leu	Asn	Asn	Ile	Lys	Lys	Glu	Trp
		275					280					285			
Trp	Glu	Lys	Asn	Lys	Ala	Asn	Leu	Trp	Asn	His	Met	Ile	Val	Asn	His
	290					295					300				
Lys	Gly	Asn	Ile	Ser	Lys	Glu	Cys	Ala	Ile	Ile	Pro	Ala	Glu	Glu	Pro
305					310					315					320
Gln	Ile	Asn	Leu	Trp	Ile	Lys	Glu	Trp	Asn	Glu	Asn	Phe	Leu	Met	Glu
			325						330					335	
Lys	Lys	Arg	Leu	Phe	Leu	Asn	Ile	Lys	Asp	Lys	Cys	Val	Glu	Asn	Lys
			340					345					350		
Lys	Tyr	Glu	Ala	Cys	Phe	Gly	Gly	Cys	Arg	Leu	Pro	Cys	Ser	Ser	Tyr
	355					360						365			
Thr	Ser	Phe	Met	Lys	Lys	Ser	Lys	Thr	Gln	Met	Glu	Val	Leu	Thr	Asn
	370					375					380				
Leu	Tyr	Lys	Lys	Lys	Asn	Ser	Gly	Val	Asp	Lys	Asn	Asn	Phe	Leu	Asn
385					390					395					400
Asp	Leu	Phe	Lys	Lys	Asn	Asn	Lys	Asn	Asp	Leu	Asp	Asp	Phe	Phe	Lys
			405						410					415	
Asn	Glu	Lys	Glu	Tyr	Asp	Asp	Leu	Cys	Asp	Cys	Arg	Tyr	Thr	Ala	Thr
			420					425					430		
Ile	Ile	Lys	Ser	Phe	Leu	Asn	Gly	Pro	Ala	Lys	Asn	Asp	Val	Asp	Ile
	435						440					445			
Ala	Ser	Gln	Ile	Asn	Val	Asn	Asp	Leu	Arg	Gly	Phe	Gly	Cys	Asn	Tyr
	450					455					460				
Lys	Ser	Asn	Asn	Glu	Lys	Ser	Trp	Asn	Cys	Thr	Gly	Thr	Phe	Thr	Asn
465					470					475					480
Lys	Phe	Pro	Gly	Thr	Cys	Glu	Pro	Pro	Arg	Arg	Gln	Thr	Leu	Cys	Leu
			485						490					495	
Gly	Arg	Thr	Tyr	Leu	Leu	His	Arg	Gly	His	Glu	Glu	Asp	Tyr	Lys	Glu
			500					505					510		
His	Leu	Leu	Gly	Ala	Ser	Ile	Tyr	Glu	Ala	Gln	Leu	Leu	Lys	Tyr	Lys
	515						520					525			
Tyr	Lys	Glu	Lys	Asp	Glu	Asn	Ala	Leu	Cys	Ser	Ile	Ile	Gln	Asn	Ser
	530					535					540				
Tyr	Ala	Asp	Leu	Ala	Asp	Ile	Ile	Lys	Gly	Ser	Asp	Ile	Ile	Lys	Asp
545					550					555					560
Tyr	Tyr	Gly	Lys	Lys	Met	Glu	Glu	Asn	Leu	Asn	Lys	Val	Asn	Lys	Asp
			565						570					575	
Lys	Lys	Arg	Asn	Glu	Glu	Ser	Leu	Lys	Ile	Phe	Arg	Glu	Lys	Trp	Trp
			580					585					590		
Asp	Glu	Asn	Lys	Glu	Asn	Val	Trp	Lys	Val	Met	Ser	Ala	Val	Leu	Lys
		595					600					605			
Asn	Lys	Glu	Thr	Cys	Lys	Asp	Tyr	Asp	Lys	Phe	Gln	Lys	Ile	Pro	Gln
	610					615					620				
Phe	Leu	Arg	Trp	Phe	Lys	Glu	Trp	Gly	Asp	Asp	Phe	Cys	Glu	Lys	Arg
625					630					635					640
Lys	Glu	Lys	Ile	Tyr	Ser	Phe	Glu	Ser	Phe	Lys	Val	Glu	Cys	Lys	Lys
			645						650					655	
Lys	Asp	Cys	Asp	Glu	Asn	Thr	Cys	Lys	Asn	Lys	Cys	Ser	Glu	Tyr	Lys
			660					665					670		
Lys	Trp	Ile	Asp	Leu	Lys	Lys	Ser	Glu	Tyr	Glu	Lys	Gln	Val	Asp	Lys
	675						680					685			
Tyr	Thr	Lys	Asp	Lys	Asn	Lys	Lys	Met	Tyr	Asp	Asn	Ile	Asp	Glu	Val
	690					695					700				
Lys	Asn	Lys	Glu	Ala	Asn	Val	Tyr	Leu	Lys	Glu	Lys	Ser	Lys	Glu	Cys
705					710					715					720
Lys	Asp	Val	Asn	Phe	Asp	Asp	Lys	Ile	Phe	Asn	Glu	Ser	Pro	Asn	Glu
			725						730					735	
Tyr	Glu	Asp	Met	Cys	Lys	Lys	Cys	Asp	Glu	Ile	Lys	Tyr	Leu	Asn	Glu
			740					745					750		
Ile	Lys	Tyr	Pro	Lys	Thr	Lys	His	Asp	Ile	Tyr	Asp	Ile	Asp	Thr	Phe
	755						760					765			

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Ser Asp Thr Phe Gly Asp Gly Thr Pro Ile Ser Ile Asn Ala Asn Ile
770 775 780
Asn Glu Gln Gln Ser Gly Lys Asp Thr Ser Asn Thr Gly Asn Ser Glu
785 790 795 800
Thr Ser Asp Ser Pro Val Ser His Glu Pro Glu Ser Asp Ala Ala Ile
805 810 815
Asn Val Glu Lys Leu Ser Gly Asp Glu Ser Ser Ser Glu Thr Arg Gly
820 825 830
Ile Leu Asp Ile Asn Asp Pro Ser Val Thr Asn Asn Val Asn Glu Val
835 840 845
His Asp Ala Ser Asn Thr Gln Gly Ser Val Ser Asn Thr Ser Asp Ile
850 855 860
Thr Asn Gly His Ser Glu Ser Ser Leu Asn Arg Thr Thr Asn Ala Gln
865 870 875 880
Asp Ile Lys Ile Gly Arg Ser Gly Asn Glu Gln Ser Asp Asn Gln Glu
885 890 895
Asn Ser Ser His Ser Ser Asp Asn Ser Gly Ser Leu Thr Ile Gly Gln
900 905 910
Val Pro Ser Glu Asp Asn Thr Gln Asn Thr Tyr Asp Ser Gln Asn Pro
915 920 925
His Arg Asp Thr Pro Asn Ala Leu Ala Ser Leu Pro Ser Asp Asp Lys
930 935 940
Ile Asn Glu Ile Glu Gly Phe Asp Ser Ser Arg Asp Ser Glu Asn Gly
945 950 955 960
Arg Gly Asp Thr Thr Ser Asn Thr His Asp Val Arg Arg Thr Asn Ile
965 970 975
Val Ser Glu Arg Arg Val Asn Ser His Asp Phe Ile Arg Asn Gly Met
980 985 990
Ala Asn Asn Asn Ala His His Gln Tyr Ile Thr Gln Ile Glu Asn Asn
995 1000 1005
Gly Ile Ile Arg Gly Gln Glu Ser Ala Gly Asn Ser Val Asn Tyr
1010 1015 1020
Lys Asp Asn Pro Lys Arg Ser Asn Phe Ser Ser Glu Asn Asp His Lys
1025 1030 1035 1040
Lys Asn Ile Gln Glu Tyr Asn Ser Arg Asp Thr Lys Arg Val Arg Glu
1045 1050 1055
Glu Ile Ile Lys Leu Ser Lys Gln Asn Lys Cys Asn Asn Glu Tyr Ser
1060 1065 1070
Met Glu Tyr Cys Thr Tyr Ser Asp Glu Arg Asn Ser Ser Pro Gly Pro
1075 1080 1085
Cys Ser Arg Glu Glu Arg Lys Lys Leu Cys Cys Gln Ile Ser Asp Tyr
1090 1095 1100
Cys Leu Lys Tyr Phe Asn Phe Tyr Ser Ile Glu Tyr Tyr Asn Cys Ile
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1125 1130 1135
Gln Ser Ser Met Phe His Ile
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<211> 1086

<212> PRT

<213> Plasmodium falciparum

<400> 2

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Asp Ile Ser Ile Lys Asp Phe Glu Lys Asn Lys Phe Ile Asp Thr Tyr
20 25 30
Ser Leu Tyr Glu Cys Gly Lys Lys Ile Lys Glu Met Lys Trp Ile Cys
35 40 45
Thr Asp Asn Gln Phe Lys Ser Asn Asn Leu Cys Ala Pro Ile Arg Arg

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50	Ile	Gln	Leu	Cys	Ile	Val	Asn	Ile	Ile	Leu	Phe	Ser	Glu	Asn	Glu	Asn
65	Glu	Tyr	Ile	Tyr	Lys	Asn	Asp	Ser	Ile	Asn	Asn	Lys	Phe	Lys	Glu	Asn
					85	Val	Lys	Leu	Glu	Ser	Asn	Leu	Leu	Val	Gln	Lys
					100					105					110	
	Asn	Asn	Glu	Tyr	Asn	Ser	Lys	Leu	Cys	Asp	Asp	Ile	Arg	Trp	Ser	Phe
					115					120					125	
	Leu	Asp	Tyr	Gly	Asp	Ile	Ile	Ile	Gly	Arg	Asp	Leu	Ile	Tyr	Lys	Asn
					130										140	
	Asn	Thr	Asp	Tyr	Ile	Lys	Glu	Gln	Phe	Lys	Lys	Ile	Phe	Asn	Asn	Glu
					145										160	
	Tyr	Asn	Asn	Asn	Glu	Leu	Asn	Asp	Glu	Leu	Asn	Asn	Glu	Leu	Asn	Asp
					165										175	
	Glu	Lys	Asn	Ile	Lys	Leu	Arg	Lys	Glu	Trp	Trp	Glu	Lys	Tyr	Lys	Glu
					180										190	
	Asp	Ile	Trp	Glu	Glu	Met	Thr	Lys	Glu	His	Asn	Asp	Lys	Phe	Ile	Glu
					195										205	
	Lys	Cys	Lys	Tyr	Phe	Ala	Lys	Asp	Glu	Pro	Gln	Ile	Val	Arg	Trp	Ile
					210										220	
	Glu	Glu	Trp	Ser	Lys	Gln	Phe	Leu	Asp	Glu	Lys	Asn	Tyr	Met	Leu	Phe
					225										240	
	Thr	Leu	Arg	Asn	Thr	Tyr	Asn	Glu	Met	Asn	Ile	Ile	His	Glu	Asn	Asn
					245										255	
	Cys	Lys	Gln	Tyr	Asn	Lys	Trp	Val	Gln	Asn	Arg	Lys	Lys	Glu	Trp	Thr
					260										270	
	Phe	Leu	Ser	Asn	Glu	Phe	Asn	Lys	Ile	Phe	Pro	Glu	Arg	Asn	Val	Gln
					275										285	
	Ile	His	Ile	Ser	Asn	Ile	Phe	Lys	Glu	Tyr	Lys	Glu	Asn	Asn	Val	Asp
					290										300	
	Ile	Ile	Phe	Gly	Thr	Leu	Asn	Tyr	Glu	Tyr	Asn	Asn	Phe	Cys	Lys	Glu
					305										320	
	Lys	Pro	Glu	Leu	Val	Ser	Ala	Ala	Lys	Tyr	Asn	Leu	Lys	Ala	Pro	Asn
					325										335	
	Ala	Lys	Ser	Pro	Arg	Ile	Tyr	Lys	Ser	Lys	Glu	His	Glu	Glu	Ser	Ser
					340										350	
	Val	Phe	Gly	Cys	Lys	Thr	Lys	Ile	Ser	Lys	Val	Lys	Lys	Lys	Trp	Asn
					355										365	
	Cys	Tyr	Ser	Asn	Asn	Lys	Val	Thr	Lys	Pro	Glu	Gly	Val	Cys	Gly	Pro
					370										380	
	Pro	Arg	Arg	Gln	Gln	Leu	Cys	Leu	Gly	Tyr	Ile	Phe	Leu	Ile	Arg	Asp
					385										400	
	Gly	Asn	Glu	Glu	Gly	Leu	Lys	Asp	His	Ile	Asn	Lys	Ala	Ala	Asn	Tyr
					405										415	
	Glu	Ala	Met	His	Leu	Lys	Glu	Lys	Tyr	Glu	Asn	Ala	Gly	Gly	Asp	Lys
					420										430	
	Ile	Cys	Asn	Ala	Ile	Leu	Gly	Ser	Tyr	Ala	Asp	Ile	Gly	Asp	Ile	Val
					435										445	
	Arg	Gly	Leu	Asp	Val	Trp	Arg	Asp	Ile	Asn	Thr	Asn	Lys	Leu	Ser	Glu
					450										460	
	Lys	Phe	Gln	Lys	Ile	Phe	Met	Gly	Gly	Gly	Asn	Ser	Arg	Lys	Lys	Gln
					465										480	
	Asn	Asp	Asn	Asn	Glu	Arg	Asn	Lys	Trp	Trp	Glu	Lys	Gln	Arg	Asn	Leu
					485										495	
	Ile	Trp	Ser	Ser	Met	Val	Lys	His	Ile	Pro	Lys	Gly	Lys	Thr	Cys	Lys
					500										510	
	Arg	His	Asn	Asn	Phe	Glu	Lys	Ile	Pro	Gln	Phe	Leu	Arg	Trp	Leu	Lys
					515										525	
	Glu	Trp	Gly	Asp	Glu	Phe	Cys	Glu	Glu	Met	Gly	Thr	Glu	Val	Lys	Gln
					530										540	
	Leu	Glu	Lys	Ile	Cys	Glu	Asn	Lys	Asn	Cys	Ser	Glu	Lys	Lys	Cys	Lys
					545										560	

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Asn	Ala	Cys	Ser	Ser	Tyr	Glu	Lys	Trp	Ile	Lys	Glu	Arg	Lys	Asn	Glu
				565					570					575	
Tyr	Asn	Leu	Gln	Ser	Lys	Lys	Phe	Asp	Ser	Asp	Lys	Lys	Leu	Asn	Lys
			580					585					590		
Lys	Asn	Asn	Leu	Tyr	Asn	Lys	Phe	Glu	Asp	Ser	Lys	Ala	Tyr	Leu	Arg
		595					600					605			
Ser	Glu	Ser	Lys	Gln	Cys	Ser	Asn	Ile	Glu	Phe	Asn	Asp	Glu	Thr	Phe
	610					615					620				
Thr	Phe	Pro	Asn	Lys	Tyr	Lys	Glu	Ala	Cys	Met	Val	Cys	Glu	Asn	Pro
	625				630					635					640
Ser	Ser	Ser	Lys	Ala	Leu	Lys	Pro	Ile	Lys	Thr	Asn	Val	Phe	Pro	Ile
				645					650					655	
Glu	Glu	Ser	Lys	Lys	Ser	Glu	Leu	Ser	Ser	Leu	Thr	Asp	Lys	Ser	Lys
			660					665					670		
Asn	Thr	Pro	Asn	Ser	Ser	Gly	Gly	Gly	Asn	Tyr	Gly	Asp	Arg	Gln	Ile
		675					680					685			
Ser	Lys	Arg	Asp	Asp	Val	His	His	Asp	Gly	Pro	Lys	Glu	Val	Lys	Ser
	690					695					700				
Gly	Glu	Lys	Glu	Val	Pro	Lys	Ile	Asp	Ala	Ala	Val	Lys	Thr	Glu	Asn
	705				710					715					720
Glu	Phe	Thr	Ser	Asn	Arg	Asn	Asp	Ile	Glu	Gly	Lys	Glu	Lys	Ser	Lys
				725					730					735	
Gly	Asp	His	Ser	Ser	Pro	Val	His	Ser	Lys	Asp	Ile	Lys	Asn	Glu	Glu
			740					745					750		
Pro	Gln	Arg	Val	Val	Ser	Glu	Asn	Leu	Pro	Lys	Ile	Glu	Glu	Lys	Met
		755					760					765			
Glu	Ser	Ser	Asp	Ser	Ile	Pro	Ile	Thr	His	Ile	Glu	Ala	Glu	Lys	Gly
	770					775					780				
Gln	Ser	Ser	Asn	Ser	Ser	Asp	Asn	Asp	Pro	Ala	Val	Val	Ser	Gly	Arg
	785				790					795					800
Glu	Ser	Lys	Asp	Val	Asn	Leu	His	Thr	Ser	Glu	Arg	Ile	Lys	Glu	Asn
				805					810					815	
Glu	Glu	Gly	Val	Ile	Lys	Thr	Asp	Glu	Ser	Ser	Lys	Ser	Ile	Glu	Ile
			820					825					830		
Ser	Lys	Ile	Pro	Ser	Asp	Gln	Asn	Asn	His	Ser	Asp	Leu	Ser	Gln	Asn
		835					840					845			
Ala	Asn	Glu	Asp	Ser	Asn	Gln	Gly	Asn	Lys	Glu	Thr	Ile	Asn	Pro	Pro
	850					855					860				
Ser	Thr	Glu	Lys	Asn	Leu	Lys	Glu	Ile	His	Tyr	Lys	Thr	Ser	Asp	Ser
	865				870					875					880
Asp	Asp	His	Gly	Ser	Lys	Ile	Lys	Ser	Glu	Ile	Glu	Pro	Lys	Glu	Leu
				885					890					895	
Thr	Glu	Glu	Ser	Pro	Leu	Thr	Asp	Lys	Lys	Thr	Glu	Ser	Ala	Ala	Ile
			900					905					910		
Gly	Asp	Lys	Asn	His	Glu	Ser	Val	Lys	Ser	Ala	Asp	Ile	Phe	Gln	Ser
		915					920					925			
Glu	Ile	His	Asn	Ser	Asp	Asn	Arg	Asp	Arg	Ile	Val	Ser	Glu	Ser	Val
	930					935					940				
Val	Gln	Asp	Ser	Ser	Gly	Ser	Ser	Met	Ser	Thr	Glu	Ser	Ile	Arg	Thr
	945				950					955					960
Asp	Asn	Lys	Asp	Phe	Lys	Thr	Ser	Glu	Asp	Ile	Ala	Pro	Ser	Ile	Asn
				965					970					975	
Gly	His	Glu	Lys	Ile	Gly	Ser	Ser	Ala	Asp	Asp	Arg	Gly	Ser	Glu	Asp
			980					985					990		
Lys	Ser	Ile	Asp	Lys	Asp	Ser	Glu	Asn	Phe	Glu	Asn	Asn	Lys	Ser	
		995				1000					1005				
Ser	His	Ser	Asp	Ile	Lys	Gln	Ser	Asp	Asn	Glu	Gly	Ser	Thr	Asp	Tyr
	1010					1015					1020				
Glu	Ser	Leu	Thr	Glu	Glu	Ser	Pro	Lys	Gly	Asp	Leu	Glu	Ser	Val	Ser
	1025				1030					1035					1040
Pro	Ser	Ser	Ile	Asp	Met	Asp	Leu	Lys	Pro	Asn	Lys	Ser	Ser	Pro	Val
				1045					1050					1055	
Thr	Ser	Phe	Asp	His	Val	Asp	Ser	Pro	Asn	Ile	Ser	Glu	Leu	Gln	Ser

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<212> PRT
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20 25 30
Glu Ile Cys Lys Ser Glu Cys Lys Lys Tyr Lys Ala Trp Ile Asp Lys
35 40 45
Lys Asn Asn Asp Phe Thr Ile Leu Ser Glu Ile Tyr Leu Lys Tyr Asn
50 55 60
Lys Lys Ser Ser Leu Tyr Lys Thr Ala Phe Glu Tyr Leu Lys Gln Lys
65 70 75 80
Trp Asp Lys Tyr Lys Glu Leu Asn Phe Ser Ser Ile Phe Asp Gln Leu
85 90 95
Asn Ala Lys Tyr Tyr Asn Lys Cys Ile Cys Gln Asn Asn Lys Ile Glu
100 105 110
Asn Asn Ala Leu Tyr Val Lys Ile Glu Asp Ile Cys Asn Asn Thr Lys
115 120 125
Val Lys Ser Ile Tyr Gly Glu Leu Tyr Cys Lys Glu Lys Gly Asn Asp
130 135 140
Lys Ile Trp Gln Cys Ile Asn Glu His Ile Lys Asp Phe Pro Asp Val
145 150 155 160
Cys Gly Pro Pro Arg Arg Gln Gln Leu Cys Leu Gly Asn Leu Asp Lys
165 170 175
Asp Glu Phe Lys Asn Val Asn Asp Leu Lys Lys Phe Leu Asn Glu Ile
180 185 190
Ile Leu Gly Ile Arg Asp Glu Gly Lys Phe Leu Ile Glu Lys Tyr Arg
195 200 205
Lys Asn Met His Glu Asn Met Tyr Leu Asp Glu Arg Ala Cys Lys Tyr
210 215 220
Leu Asn Tyr Ser Phe Asp Asp Tyr Lys Asn Ile Ile Leu Gly Lys Asp
225 230 235 240
Met Trp Arg Asp Pro Asn Ser Ile Lys Thr Glu Asn Ile Leu Lys Gly
245 250 255
Asn Phe Glu Gly Ile Lys Ala Asn Ile Val Ser Met Tyr Pro Ser Tyr
260 265 270
Ala Asp Leu Ser Leu Asp Glu Phe Arg Lys His Trp Trp Asp Gln Asn
275 280 285
Lys Lys Gln Leu Trp Glu Ala Ile Ser Cys Glu Phe Tyr Lys Gly Asn
290 295 300
His Thr Gly Val Cys Leu Met Glu Asp Asp Asn Asp Asn Gln Tyr Leu
305 310 315 320
His Trp Phe Arg Glu Trp Lys Asn Asp Phe Cys Ile Asp Lys Leu Lys
325 330 335
Trp Asn Asp Val Ile Lys Glu Pro Cys Ile Asp Lys Lys Val Lys Ser
340 345 350
Pro Lys Pro Ser Glu Asn Pro Ser Asp Val Ala Thr Val Cys Asn Lys
355 360 365
Ser Cys Thr Asp Tyr Asp Lys Trp Ile Ile Asn Lys Arg Lys Glu Tyr
370 375 380
Lys Met Gln Ser Ser Lys Tyr Lys Arg Asp Arg Ser Leu Phe Asn Asn
385 390 395 400
Val Ile Gln Asn Leu Lys Pro Trp Glu Tyr Leu Ser Met Lys Cys Thr
405 410 415

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Glu	Cys	Thr	Cys	Asn	Leu	Asp	Thr	Gln	Thr	Phe	Val	Tyr	Pro	Tyr	Lys
			420					425					430		
Gly	Tyr	Glu	Asp	Ile	Cys	Lys	Ser	Thr	Val	Lys	Pro	Tyr	Asp	Pro	Glu
		435					440					445			
Asp	Ile	Lys	Asp	Glu	Glu	Phe	Asn	Glu	Pro	Ser	Leu	Asn	Val	Asn	Pro
	450					455					460				
Leu	Ser	Leu	Thr	Ser	Gln	Asp	Val	Thr	Glu	Arg	Val	Ser	Ser	Val	Asp
465					470					475					480
Asp	Val	Leu	Ser	Ile	Lys	Glu	Asn	Val	Asp	Leu	Lys	Pro	Phe	Lys	Pro
				485					490					495	
Lys	Gly	Gly	Thr	Gln	Ser	Ser	His	Val	Asp	Gln	Val	Gly	Asn	Pro	Arg
			500					505					510		
Glu	Ser	Glu	Ser	Lys	Pro	Ser	Gly	Ala	Asn	Gly	Arg	Glu	Asp	Pro	Ser
		515					520					525			
Thr	Glu	Ser	Ser	Thr	Tyr	Asn	Asp	Gly	Val	Ile	Thr	Ser	Ser	Ser	Ser
	530					535					540				
Leu	Gly	Ser	Ser	Ser	Gly	Arg	Asp	Val	Ser	Ser	Ser	Pro	Val	Gly	Val
545					550					555					560
Gly	Asp	Glu	His	Glu	Ala	Lys	Glu	Leu	Leu	Pro	Pro	Gln	Lys	Ile	Ile
				565					570					575	
Asp	Gly	Val	Thr	Gln	Ser	Asp	Glu	Ser	Thr	Leu	Ser	Gln	His	Gly	Lys
			580					585					590		
Glu	Ser	Ser	Gln	Glu	Gln	His	Asn	Leu	Asp	Gly	Ser	Ser	Leu	Ser	Arg
		595					600					605			
His	Ser	Asn	Gln	Asp	Glu	Glu	Arg	Ser	Ile	Ile	Thr	Ser	Asp	Val	Glu
	610					615					620				
His	Gly	Thr	Asn	Ser	Leu	Phe	Gly	Ser	Gln	Ile	Gln	Asp	Gln	Glu	Thr
625					630					635					640
Ile	Leu	Gly	Glu	Ser	Glu	Pro	Leu	Thr	Thr	Ser	Pro	Pro	Glu	His	Glu
				645					650					655	
Thr	Ser	Lys	Met	Asp	Thr	His	Ala	Gly	Gly	Lys	Asn	Met	Glu	Gln	Val
			660					665					670		
Arg	Asn	Ala	Ser	Val	Asp	Ser	Ser	Glu	Met	Ser	Asn	Gly	Gly	Arg	
		675					680					685			
Gly	Gly	Leu	Lys	Thr	Lys	Glu	Met	Lys	Gly	Glu	Glu	Val	Thr	Gly	Ile
	690					695					700				
Thr	Ser	Lys	Asn	Asp	Ile	Asn	Leu	Glu	Asp	Ser	Thr	Val	His	Ser	Arg
705					710					715					720
Gln	Asn	Lys	Ile	Glu	Asn	Ser	Gly	Asp	Asn	Thr	Gln	Gly	Lys	Glu	His
				725					730					735	
Ile	Asn	Val	Leu	Gln	Gly	Met	Asp	Lys	His	Leu	Glu	Asn	Pro	Pro	Thr
			740					745					750		
Ser	Glu	Arg	Gly	Asp	Ser	Val	Leu	Glu	Ser	Glu	Phe	Ser	Lys	Leu	Asn
		755					760					765			
Arg	Thr	Ser	His	Thr	His	Asp	Asn	Asn	Arg	Ile	Glu	Thr	Thr	Ala	Glu
	770					775					780				
Asn	Asn	Ile	Gly	Gly	Leu	Ser	Asn	Ser	Asn	Val	His	Asp	Gly	Arg	Asp
785					790					795					800
Ser	Gln	Arg	Asn	Arg	Met	His	Ile	Asn	Ser	Arg	Ser	Arg	His	Gly	Ser
				805					810					815	
Leu	Glu	Ser	Asp	Ile	Val	Val	Arg	Gly	Asp	Asp	Ile	Ser	Asn	Ile	Glu
			820					825					830		
Gly	Gly	Glu	Glu	Glu	Glu	Glu	Asp	Ala	Asn	Thr	Leu	Lys	Tyr	Pro	Arg
		835					840					845			
Asn	Val	Leu	Asn	Asn	Lys	Asn	Ser	Arg	Thr	Tyr	Asn	Ile	Glu	Glu	Tyr
	850					855					860				
Ile	Tyr	Arg	Asp	Val	Asn	Lys	Val	Ala	Asp	Asp	Ile	Met	Arg	Ser	Tyr
865					870					875					880
Lys	Ser	Asn	Arg	Cys	Thr	Asn	Asn	Leu	Ser	Ser	Asn	Tyr	Cys	Ser	Lys
				885					890					895	
Leu	Lys	Lys	Glu	Ser	Leu	Ser	Asn	Thr	Cys	Thr	Asn	Glu	Asp	Ser	Lys
			900					905					910		
Arg	Leu	Cys	Cys	Ser	Ile	Ser	Asp	Tyr	Cys	Met	Lys	Phe	Phe	Asn	Phe

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Asn	Ser	915	Gly	Tyr	His	Ser	920	Cys	Met	Arg	Lys	Glu	925	Phe	Ser	Asn	His
930	Tyr	Lys	Cys	Phe	Ala	935	Gly	Lys	Gly	Phe	Ser	940	Ser	Met	Phe	Asn	Leu
945	Lys	Lys	Lys	Lys	950	Lys	Lys	Lys	Lys	Lys	955	Lys	Gly				960
Asp				965						970							

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 <211> 1501
 <212> PRT
 <213> Plasmodium falciparum

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1	Ile	Leu	Tyr	Val	Val	Leu	Cys	Thr	Tyr	Val	Leu	Gly	Ile	Ser	Glu
			20						25					30	
Tyr	Leu	Lys	Glu	Arg	Pro	Gln	Gly	Leu	Asn	Val	Glu	Thr	Asn	Asn	Asn
		35					40					45			
Asn	Asn	Asn	Asn	Asn	Asn	Asn	Asn	Ser	Asn	Ser	Asn	Asp	Ala	Met	Ser
	50					55					60				
Phe	Val	Asn	Glu	Val	Ile	Arg	Phe	Ile	Glu	Asn	Glu	Lys	Asp	Asp	Lys
65					70				75						80
Glu	Asp	Lys	Lys	Val	Lys	Ile	Ile	Ser	Arg	Pro	Val	Glu	Asn	Thr	Leu
				85					90					95	
His	Arg	Tyr	Pro	Val	Ser	Ser	Phe	Leu	Asn	Ile	Lys	Lys	Tyr	Gly	Arg
			100					105					110		
Lys	Gly	Glu	Tyr	Leu	Asn	Arg	Asn	Ser	Phe	Val	Gln	Arg	Ser	Tyr	Ile
		115					120					125			
Arg	Gly	Cys	Lys	Gly	Lys	Arg	Ser	Thr	His	Thr	Trp	Ile	Cys	Glu	Asn
	130					135					140				
Lys	Gly	Asn	Asn	Asn	Ile	Cys	Ile	Pro	Asp	Arg	Arg	Val	Gln	Leu	Cys
145					150					155					160
Ile	Thr	Ala	Leu	Gln	Asp	Leu	Lys	Asn	Ser	Gly	Ser	Glu	Thr	Thr	Asp
				165					170					175	
Arg	Lys	Leu	Leu	Arg	Asp	Lys	Val	Phe	Asp	Ser	Ala	Met	Tyr	Glu	Thr
			180					185					190		
Asp	Leu	Leu	Trp	Asn	Lys	Tyr	Gly	Phe	Arg	Gly	Phe	Asp	Asp	Phe	Cys
		195					200					205			
Asp	Asp	Val	Lys	Asn	Ser	Tyr	Leu	Asp	Tyr	Lys	Asp	Val	Ile	Phe	Gly
	210					215					220				
Thr	Asp	Leu	Asp	Lys	Asn	Ile	Ser	Lys	Leu	Val	Glu	Glu	Ser	Leu	
225					230					235					
Lys	Arg	Phe	Phe	Lys	Lys	Asp	Ser	Ser	Val	Leu	Asn	Pro	Thr	Ala	Trp
				245					250					255	
Trp	Arg	Arg	Tyr	Gly	Thr	Arg	Leu	Trp	Lys	Thr	Met	Ile	Gln	Pro	Tyr
			260					265					270		
Ala	His	Leu	Gly	Cys	Arg	Lys	Pro	Asp	Glu	Asn	Glu	Pro	Gln	Ile	Asn
		275					280					285			
Arg	Trp	Ile	Leu	Glu	Trp	Gly	Lys	Tyr	Asn	Cys	Arg	Leu	Met	Lys	Glu
	290					295					300				
Lys	Glu	Lys	Leu	Leu	Thr	Gly	Glu	Cys	Ser	Val	Asn	Arg	Lys	Lys	Ser
305					310					315					320
Asp	Cys	Ser	Thr	Gly	Cys	Asn	Asn	Glu	Cys	Tyr	Thr	Tyr	Arg	Ser	Leu
				325					330					335	
Ile	Asn	Arg	Gln	Arg	Tyr	Glu	Val	Ser	Ile	Leu	Gly	Lys	Lys	Tyr	Ile
			340					345					350		
Lys	Val	Val	Arg	Tyr	Thr	Ile	Phe	Arg	Arg	Lys	Ile	Val	Gln	Pro	Asp
		355					360					365			
Asn	Ala	Leu	Asp	Phe	Leu	Lys	Leu	Asn	Cys	Ser	Glu	Cys	Lys	Asp	Ile
	370					375					380				

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Asp	Phe	Lys	Pro	Phe	Phe	Glu	Phe	Glu	Tyr	Gly	Lys	Tyr	Glu	Glu	Lys
385					390					395					400
Cys	Met	Cys	Gln	Ser	Tyr	Ile	Asp	Leu	Lys	Ile	Gln	Phe	Lys	Asn	Asn
				405					410					415	
Asp	Ile	Cys	Ser	Phe	Asn	Ala	Gln	Thr	Asp	Thr	Val	Ser	Ser	Asp	Lys
			420					425					430		
Arg	Phe	Cys	Leu	Glu	Lys	Lys	Glu	Phe	Lys	Pro	Trp	Lys	Cys	Asp	Lys
		435					440					445			
Asn	Ser	Phe	Glu	Thr	Val	His	His	Lys	Gly	Val	Cys	Val	Ser	Pro	Arg
	450					455					460				
Arg	Gln	Gly	Phe	Cys	Leu	Gly	Asn	Leu	Asn	Tyr	Leu	Leu	Asn	Asp	Asp
465					470					475					480
Ile	Tyr	Asn	Val	His	Asn	Ser	Gln	Leu	Leu	Ile	Glu	Ile	Ile	Met	Ala
				485					490					495	
Ser	Lys	Gln	Glu	Gly	Lys	Leu	Leu	Trp	Lys	Lys	His	Gly	Thr	Ile	Leu
			500					505					510		
Asp	Asn	Gln	Asn	Ala	Cys	Lys	Tyr	Ile	Asn	Asp	Ser	Tyr	Val	Asp	Tyr
		515					520					525			
Lys	Asp	Ile	Val	Ile	Gly	Asn	Asp	Leu	Trp	Asn	Asp	Asn	Asn	Ser	Ile
	530					535					540				
Lys	Val	Gln	Asn	Asn	Leu	Asn	Leu	Ile	Phe	Glu	Arg	Asn	Phe	Gly	Tyr
545					550					555					560
Lys	Val	Gly	Arg	Asn	Lys	Leu	Phe	Lys	Thr	Ile	Lys	Glu	Leu	Lys	Asn
				565					570					575	
Val	Trp	Trp	Ile	Leu	Asn	Arg	Asn	Lys	Val	Trp	Glu	Ser	Met	Arg	Cys
			580					585					590		
Gly	Ile	Asp	Glu	Val	Asp	Gln	Arg	Arg	Lys	Thr	Cys	Glu	Arg	Ile	Asp
		595				600						605			
Glu	Leu	Glu	Asn	Met	Pro	Gln	Phe	Phe	Arg	Trp	Phe	Ser	Gln	Trp	Ala
	610					615					620				
His	Phe	Phe	Cys	Lys	Glu	Lys	Glu	Tyr	Trp	Glu	Leu	Lys	Leu	Asn	Asp
625					630					635					640
Lys	Cys	Thr	Gly	Asn	Asn	Gly	Lys	Ser	Leu	Cys	Gln	Asp	Lys	Thr	Cys
				645					650					655	
Gln	Asn	Val	Cys	Thr	Asn	Met	Asn	Tyr	Trp	Thr	Tyr	Thr	Arg	Lys	Leu
			660					665					670		
Ala	Tyr	Glu	Ile	Gln	Ser	Val	Lys	Tyr	Asp	Lys	Asp	Arg	Lys	Leu	Phe
		675					680					685			
Ser	Leu	Ala	Lys	Asp	Lys	Asn	Val	Thr	Thr	Phe	Leu	Lys	Glu	Asn	Ala
	690					695					700				
Lys	Asn	Cys	Ser	Asn	Ile	Asp	Phe	Thr	Lys	Ile	Phe	Asp	Gln	Leu	Asp
705					710					715					720
Lys	Leu	Phe	Lys	Glu	Arg	Cys	Ser	Cys	Met	Asp	Thr	Gln	Val	Leu	Glu
				725					730					735	
Val	Lys	Asn	Lys	Glu	Met	Leu	Ser	Ile	Asp	Ser	Asn	Ser	Glu	Asp	Ala
			740					745					750		
Thr	Asp	Ile	Ser	Glu	Lys	Asn	Gly	Glu	Glu	Glu	Leu	Tyr	Val	Asn	His
		755					760					765			
Asn	Ser	Val	Ser	Val	Ala	Ser	Gly	Asn	Lys	Glu	Ile	Glu	Lys	Ser	Lys
	770					775					780				
Asp	Glu	Lys	Gln	Pro	Glu	Lys	Glu	Ala	Lys	Gln	Thr	Asn	Gly	Thr	Leu
785					790					795					800
Thr	Val	Arg	Thr	Asp	Lys	Asp	Ser	Asp	Arg	Asn	Lys	Gly	Lys	Asp	Thr
				805					810					815	
Ala	Thr	Asp	Thr	Lys	Asn	Ser	Pro	Glu	Asn	Leu	Lys	Val	Gln	Glu	His
			820					825					830		
Gly	Thr	Asn	Gly	Glu	Thr	Ile	Lys	Glu	Glu	Pro	Pro	Lys	Leu	Pro	Glu
		835					840					845			
Ser	Ser	Glu	Thr	Leu	Gln	Ser	Gln	Glu	Gln	Leu	Glu	Ala	Glu	Ala	Gln
	850					855					860				
Lys	Gln	Lys	Gln	Glu	Glu	Glu	Pro	Lys	Lys	Lys	Gln	Glu	Glu	Glu	Pro
865					870					875					880
Lys	Lys	Lys	Gln	Glu	Glu	Glu	Gln	Lys	Arg	Glu	Gln	Glu	Gln	Lys	Gln

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				885					890					895					
Glu	Gln	Glu	Glu	900	Glu	Gln	Lys	Gln	905	Glu	Glu	Gln	Gln	910	Ile	Gln			
Asp	Gln	Ser	Gln	915	Ser	Gly	Leu	Asp	920	Gln	Ser	Ser	Lys	925	Val	Gly	Val	Ala	
Ser	Glu	Gln	Asn	930	Glu	Ile	Ser	Ser	935	Gly	Gln	Glu	Gln	940	Asn	Val	Lys	Ser	
Ser	Ser	Pro	Glu	945	Val	Val	Pro	Gln	950	Glu	Thr	Thr	Ser	955	Glu	Asn	Gly	Ser	
Ser	Gln	Asp	Thr	965	Lys	Ile	Ser	Ser	970	Thr	Glu	Pro	Asn	975	Glu	Asn	Ser	Val	
Val	Asp	Arg	Ala	980	Thr	Asp	Ser	Met	985	Asn	Leu	Asp	Pro	990	Glu	Lys	Val	His	
Asn	Glu	Asn	Met	995	Ser	Asp	Pro	Asn	1000	Thr	Asn	Thr	Glu	1005	Pro	Asp	Ala	Ser	
Leu	Lys	Asp	Asp	1010	Lys	Lys	Glu	Val	1015	Asp	Asp	Ala	Lys	1020	Lys	Lys	Glu	Leu	Gln
Ser	Thr	Val	Ser	1025	Arg	Ile	Glu	Ser	1030	Asn	Glu	Gln	Asp	1035	Val	Gln	Ser	Thr	
Pro	Pro	Glu	Asp	1045	Thr	Pro	Thr	Val	1050	Glu	Gly	Lys	Val	1055	Gly	Asp	Lys	Ala	
Glu	Met	Leu	Thr	1060	Ser	Pro	His	Ala	1065	Thr	Asp	Asn	Ser	1070	Glu	Ser	Glu	Ser	
Gly	Leu	Asn	Pro	1075	Thr	Asp	Asp	Ile	1080	Lys	Thr	Thr	Asp	1085	Gly	Val	Val	Lys	
Glu	Gln	Glu	Ile	1090	Leu	Gly	Gly	Gly	1095	Glu	Ser	Ala	Thr	1100	Glu	Thr	Ser	Lys	
Ser	Asn	Leu	Glu	1105	Lys	Pro	Lys	Asp	1110	Val	Glu	Pro	Ser	1115	His	Glu	Ile	Ser	
Glu	Pro	Val	Leu	1125	Ser	Gly	Thr	Thr	1130	Gly	Lys	Glu	Glu	1135	Ser	Glu	Leu	Leu	
Lys	Ser	Lys	Ser	1140	Ile	Glu	Thr	Lys	1145	Gly	Glu	Thr	Asp	1150	Pro	Arg	Ser	Asn	
Asp	Gln	Glu	Asp	1155	Ala	Thr	Asp	Asp	1160	Val	Val	Glu	Asn	1165	Ser	Arg	Asp	Asp	
Asn	Asn	Ser	Leu	1170	Ser	Asn	Ser	Val	1175	Asp	Asn	Gln	Ser	1180	Asn	Val	Leu	Asn	
Arg	Glu	Asp	Pro	1185	Ile	Ala	Ser	Glu	1190	Thr	Glu	Val	Val	1195	Ser	Glu	Pro	Glu	
Asp	Ser	Ser	Arg	1205	Ile	Ile	Thr	Thr	1210	Glu	Val	Pro	Ser	1215	Thr	Thr	Val	Lys	
Pro	Pro	Asp	Glu	1220	Lys	Arg	Ser	Glu	1225	Glu	Val	Gly	Glu	1230	Lys	Glu	Ala	Lys	
Glu	Ile	Lys	Val	1235	Glu	Pro	Val	Val	1240	Pro	Arg	Ala	Ile	1245	Gly	Glu	Pro	Met	
Glu	Asn	Ser	Val	1250	Ser	Val	Gln	Ser	1255	Pro	Pro	Asn	Val	1260	Glu	Asp	Val	Glu	
Lys	Glu	Thr	Leu	1265	Ile	Ser	Glu	Asn	1270	Asn	Gly	Leu	His	1275	Asn	Asp	Thr	His	
Arg	Gly	Asn	Ile	1285	Ser	Glu	Lys	Asp	1290	Leu	Ile	Asp	Ile	1295	His	Leu	Leu	Arg	
Asn	Glu	Ala	Gly	1300	Ser	Thr	Ile	Leu	1305	Asp	Asp	Ser	Arg	1310	Arg	Asn	Gly	Glu	
Met	Thr	Glu	Gly	1315	Ser	Glu	Ser	Asp	1320	Val	Gly	Glu	Leu	1325	Gln	Glu	His	Asn	
Phe	Ser	Thr	Gln	1330	Gln	Lys	Asp	Glu	1335	Lys	Asp	Phe	Asp	1340	Gln	Ile	Ala	Ser	
Asp	Arg	Glu	Lys	1345	Glu	Glu	Ile	Gln	1350	Lys	Leu	Leu	Asn	1355	Ile	Gly	His	Glu	
Glu	Asp	Glu	Asp	1365	Val	Leu	Lys	Met	1370	Asp	Arg	Thr	Glu	1375	Asp	Ser	Met	Ser	
Asp	Gly	Val	Asn	1380	Ser	His	Leu	Tyr	1385	Tyr	Asn	Asn	Leu	1390	Ser	Ser	Glu	Glu	

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Lys Met Glu Gln Tyr Asn Asn Arg Asp Ala Ser Lys Asp Arg Glu Glu
1395 1400 1405
Ile Leu Asn Arg Ser Asn Thr Asn Thr Cys Ser Asn Glu His Ser Leu
1410 1415 1420
Lys Tyr Cys Gln Tyr Met Glu Arg Asn Lys Asp Leu Leu Glu Thr Cys
1425 1430 1435 1440
Ser Glu Asp Lys Arg Leu His Leu Cys Cys Glu Ile Ser Asp Tyr Cys
1445 1450 1455
Leu Lys Phe Phe Asn Pro Lys Ser Ile Glu Tyr Phe Asp Cys Thr Gln
1460 1465 1470
Lys Glu Phe Asp Asp Pro Thr Tyr Asn Cys Phe Arg Lys Gln Arg Phe
1475 1480 1485
Thr Ser Met Ser Cys Tyr Lys Ile Lys Asn Asn Ile His
1490 1495 1500

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<213> Artificial Sequence

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<223> synthetic peptide

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<212> DNA
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<220>
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<210> 8
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 <212> DNA
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 <210> 11
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 <223> EBP3 forward primer

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 <210> 13
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 <223> EBP3 reverse primer

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 <210> 14
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 <213> Artificial Sequence

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 <223> EBP4 forward primer

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<211> 40
<212> DNA
<213> Artificial Sequence

<220>
<223> EBP4 reverse primer

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<210> 16
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<213> Artificial Sequence

<220>
<223> EBP5 forward primer

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<210> 17
<211> 34
<212> DNA
<213> Artificial Sequence

<220>
<223> EBP5 reverse primer

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<210> 18
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<212> PRT
<213> Plasmodium falciparum

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Tyr Phe Ala Lys Ala Arg Asn Glu Tyr Asp Ile Lys Glu Asn Glu Lys
20 25 30
Phe Leu Asp Val Tyr Lys Glu Lys Phe Asn Glu Leu Asp Lys Lys Lys
35 40 45
Tyr Gly Asn Val Gln Lys Thr Asp Lys Lys Ile Phe Thr Phe Ile Glu
50 55 60
Asn Lys Leu Asp Ile Leu Asn Asn Ser Lys Phe Asn Lys Arg Trp Lys
65 70 75 80
Ser Tyr Gly Thr Pro Asp Asn Ile Asp Lys Asn Met Ser Leu Ile Asn
85 90 95
Lys His Asn Asn Glu Glu Met Phe Asn Asn Tyr Gln Ser Phe Leu
100 105 110
Ser Thr Ser Ser Leu Ile Lys Gln Asn Lys Tyr Val Pro Ile Asn Ala
115 120 125
Val Arg Val Ser Arg Ile Leu Ser Phe Leu Asp Ser Arg Ile Asn Asn
130 135 140
Gly Arg Asn Thr Ser Ser Asn Asn Glu Val Leu Ser Asn Cys Arg Glu
145 150 155 160
Lys Arg Lys Gly Met Lys Trp Asp Cys Lys Lys Lys Asn Asp Arg Ser
165 170 175

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Asn	Tyr	Val	Cys	Ile	Pro	Asp	Arg	Arg	Ile	Gln	Leu	Cys	Ile	Val	Asn
			180					185					190		
Leu	Ser	Ile	Ile	Lys	Thr	Tyr	Thr	Lys	Glu	Thr	Met	Lys	Asp	His	Phe
		195					200					205			
Ile	Glu	Ala	Ser	Lys	Lys	Glu	Ser	Gln	Leu	Leu	Leu	Lys	Lys	Asn	Asp
	210					215					220				
Asn	Lys	Tyr	Asn	Ser	Lys	Phe	Cys	Asn	Asp	Leu	Lys	Asn	Ser	Phe	Leu
225					230					235					240
Asp	Tyr	Gly	His	Leu	Ala	Met	Gly	Asn	Asp	Met	Asp	Phe	Gly	Gly	Tyr
				245					250					255	
Ser	Thr	Lys	Ala	Glu	Asn	Lys	Ile	Gln	Glu	Val	Phe	Lys	Gly	Ala	His
			260					265					270		
Gly	Glu	Ile	Ser	Glu	His	Lys	Ile	Lys	Asn	Phe	Arg	Lys	Lys	Trp	Trp
		275					280								
Asn	Glu	Phe	Arg	Glu	Lys	Leu	Trp	Glu	Ala	Met	Leu	Ser	Glu	His	Lys
	290					295					300				
Asn	Asn	Ile	Asn	Asn	Cys	Lys	Asn	Ile	Pro	Gln	Glu	Glu	Leu	Gln	Ile
305					310					315					320
Thr	Gln	Trp	Ile	Lys	Glu	Trp	His	Gly	Glu	Phe	Leu	Leu	Glu	Arg	Asp
				325					330					335	
Asn	Arg	Ser	Lys	Leu	Pro	Lys	Ser	Lys	Cys	Lys	Asn	Asn	Thr	Leu	Tyr
			340					345					350		
Glu	Ala	Cys	Glu	Lys	Glu	Cys	Ile	Asp	Pro	Cys	Met	Lys	Tyr	Arg	Asp
		355					360					365			
Trp	Ile	Ile	Arg	Ser	Lys	Phe	Glu	Trp	His	Thr	Leu	Ser	Lys	Glu	Tyr
	370					375					380				
Glu	Thr	Gln	Lys	Val	Pro	Lys	Glu	Asn	Ala	Glu	Asn	Tyr	Leu	Ile	Lys
385					390					395					400
Ile	Ser	Glu	Asn	Lys	Asn	Asp	Ala	Lys	Val	Ser	Leu	Leu	Leu	Asn	Asn
				405					410					415	
Cys	Asp	Ala	Glu	Tyr	Ser	Lys	Tyr	Cys	Asp	Cys	Lys	His	Thr	Thr	Thr
			420					425					430		
Leu	Val	Lys	Ser	Val	Leu	Asn	Gly	Asn	Asp	Asn	Thr	Ile	Lys	Glu	Lys
		435					440					445			
Arg	Glu	His	Ile	Asp	Leu	Asp	Asp	Phe	Ser	Lys	Phe	Gly	Cys	Asp	Lys
	450					455					460				
Asn	Ser	Val	Asp	Thr	Asn	Thr	Lys	Val	Trp	Glu	Cys	Lys	Lys	Pro	Tyr
465					470					475					480
Lys	Leu	Ser	Thr	Lys	Asp	Val	Cys	Val	Pro	Pro	Arg	Arg	Gln	Glu	Leu
				485					490					495	
Cys	Leu	Gly	Asn	Ile	Asp	Arg	Ile	Tyr	Asp	Lys	Asn	Leu	Leu	Met	Ile
			500					505					510		
Lys	Glu	His	Ile	Leu	Ala	Ile	Ala	Ile	Tyr	Glu	Ser	Arg	Ile	Leu	Lys
		515					520					525			
Arg	Lys	Tyr	Lys	Asn	Lys	Asp	Asp	Lys	Glu	Val	Cys	Lys	Ile	Ile	Asn
	530					535					540				
Lys	Thr	Phe	Ala	Asp	Ile	Arg	Asp	Ile	Ile	Gly	Gly	Thr	Asp	Tyr	Trp
545					550					555					560
Asn	Asp	Leu	Ser	Asn	Arg	Lys	Leu	Val	Gly	Lys	Ile	Asn	Thr	Asn	Ser
				565					570					575	
Asn	Tyr	Val	His	Arg	Asn	Lys	Gln	Asn	Asp	Lys	Leu	Phe	Arg	Asp	Glu
			580					585					590		
Trp	Trp	Lys	Val	Ile	Lys	Lys	Asp	Val	Trp	Asn	Val	Ile	Ser	Trp	Val
		595					600					605			
Phe	Lys	Asp	Lys	Thr	Val	Cys	Lys	Glu	Asp	Asp	Ile	Glu	Asn	Ile	Pro
	610					615					620				
Gln	Phe	Phe	Arg	Trp	Phe	Ser	Glu	Trp	Gly	Asp	Asp	Tyr	Cys	Gln	Asp
625					630					635					640
Lys	Thr	Lys	Met	Ile	Glu	Thr	Leu	Lys	Val	Glu	Cys	Lys	Glu	Lys	Pro
				645					650					655	
Cys	Glu	Asp	Asp	Asn	Cys	Lys	Arg	Lys	Cys	Asn	Ser	Tyr	Lys	Glu	Trp
			660					665					670		
Ile	Ser	Lys	Lys	Lys	Glu	Glu	Tyr	Asn	Lys	Gln	Ala	Lys	Gln	Tyr	Gln

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Glu	Tyr	675	Gln	Lys	Gly	Asn	Asn	680	Tyr	Lys	Met	Tyr	Ser	685	Glu	Phe	Lys	Ser
Ile	Lys	690	Pro	Glu	Val	Tyr	Leu	695	Lys	Lys	Tyr	Ser	Glu	700	Lys	Cys	Ser	Asn
705	Leu	Asn	Phe	Glu	Asp	710	Glu	Phe	Lys	Glu	Glu	715	Leu	His	Ser	Asp	Tyr	720
				725							730						735	
Asn	Lys	Cys	Thr	Met	Cys	Pro	Glu	Val	Lys	Asp	Val	Pro	Ile	750	Ser	Ile		
Ile	Arg	Asn	Asn	Glu	Gln	Thr	Ser	Gln	Glu	Ala	Val	Pro	Glu	Glu	Ser			
		755						760						765				
Thr	Glu	Ile	Ala	His	Arg	Thr	Glu	Thr	Arg	Thr	Asp	Glu	Arg	Lys	Asn			
		770						775						780				
Gln	Glu	Pro	Ala	Asn	Lys	Asp	Leu	Lys	Asn	Pro	Gln	Gln	Ser	Val	Gly			
785	Glu	Asn	Gly	Thr	Lys	Asp	Leu	Leu	Gln	Glu	Asp	Leu	Gly	Gly	Ser	Arg		
				805							810					815		
Ser	Glu	Asp	Glu	Val	Thr	Gln	Glu	Phe	Gly	Val	Asn	His	Gly	Ile	Pro			
			820					825						830				
Lys	Gly	Glu	Asp	Gln	Thr	Leu	Gly	Lys	Ser	Asp	Ala	Ile	Pro	Asn	Ile			
		835						840						845				
Gly	Glu	Pro	Glu	Thr	Gly	Ile	Ser	Thr	Thr	Glu	Glu	Ser	Arg	His	Glu			
		850						855						860				
Glu	Gly	His	Asn	Lys	Gln	Ala	Leu	Ser	Thr	Ser	Val	Asp	Glu	Pro	Glu			
865	Leu	Ser	Asp	Thr	Leu	Gln	Leu	His	Glu	Asp	Thr	Lys	Glu	Asn	Asp	Lys		
				885							890				895			
Leu	Pro	Leu	Glu	Ser	Ser	Thr	Ile	Thr	Ser	Pro	Thr	Glu	Ser	Gly	Ser			
			900					905						910				
Ser	Asp	Thr	Glu	Glu	Thr	Pro	Ser	Ile	Ser	Glu	Gly	Pro	Lys	Gly	Asn			
		915						920						925				
Glu	Gln	Lys	Lys	Arg	Asp	Asp	Asp	Ser	Leu	Ser	Lys	Ile	Ser	Val	Ser			
		930						935						940				
Pro	Glu	Asn	Ser	Arg	Pro	Glu	Thr	Asp	Ala	Lys	Asp	Thr	Ser	Asn	Leu			
945	Leu	Lys	Leu	Lys	Gly	Asp	Val	Asp	Ile	Ser	Met	Pro	Lys	Ala	Val	Ile		
				965							970				975			
Gly	Ser	Ser	Pro	Asn	Asp	Asn	Ile	Asn	Val	Thr	Glu	Gln	Gly	Asp	Asn			
			980					985						990				
Ile	Ser	Gly	Val	Asn	Ser	Lys	Pro	Leu	Ser	Asp	Asp	Val	Arg	Pro	Asp			
		995						1000						1005				
Lys	Asn	His	Glu	Glu	Val	Lys	Glu	His	Thr	Ser	Asn	Ser	Asp	Asn	Val			
		1010						1015						1020				
Gln	Gln	Ser	Gly	Gly	Ile	Val	Asn	Met	Asn	Val	Glu	Lys	Glu	Leu	Lys			
1025	Asp	Thr	Leu	Glu	Asn	Pro	Ser	Ser	Ser	Leu	Asp	Glu	Gly	Lys	Ala	His		
				1045							1050				1055			
Glu	Glu	Leu	Ser	Glu	Pro	Asn	Leu	Ser	Ser	Asp	Gln	Asp	Met	Ser	Asn			
			1060					1065						1070				
Thr	Pro	Gly	Pro	Leu	Asp	Asn	Thr	Ser	Glu	Glu	Thr	Thr	Glu	Arg	Ile			
		1075						1080						1085				
Ser	Asn	Asn	Glu	Tyr	Lys	Val	Asn	Glu	Arg	Glu	Gly	Glu	Arg	Thr	Leu			
		1090						1095						1100				
Thr	Lys	Glu	Tyr	Glu	Asp	Ile	Val	Leu	Lys	Ser	His	Met	Asn	Arg	Glu			
1105	Ser	Asp	Asp	Gly	Glu	Leu	Tyr	Asp	Glu	Asn	Ser	Asp	Leu	Ser	Thr	Val		
				1125							1130				1135			
Asn	Asp	Glu	Ser	Glu	Asp	Ala	Glu	Ala	Lys	Met	Lys	Gly	Asn	Asp	Thr			
			1140					1145						1150				
Ser	Glu	Met	Ser	His	Asn	Ser	Ser	Gln	His	Ile	Glu	Ser	Asp	Gln	Gln			
		1155						1160						1165				
Lys	Asn	Asp	Met	Lys	Thr	Val	Gly	Asp	Leu	Gly	Thr	Thr	His	Val	Gln			
		1170						1175						1180				

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Asn	Glu	Ile	Ser	Val	Pro	Val	Thr	Gly	Glu	Ile	Asp	Glu	Lys	Leu	Arg		
1185					1190					1195					1200		
Glu	Ser	Lys	Glu	Ser	Lys	Ile	His	Lys	Ala	Glu	Glu	Glu	Arg	Leu	Ser		
				1205					1210					1215			
His	Thr	Asp	Ile	His	Lys	Ile	Asn	Pro	Glu	Asp	Arg	Asn	Ser	Asn	Thr		
			1220				1225						1230				
Leu	His	Leu	Lys	Asp	Ile	Arg	Asn	Glu	Glu	Asn	Glu	Arg	His	Leu	Thr		
		1235					1240					1245					
Asn	Gln	Asn	Ile	Asn	Ile	Ser	Gln	Glu	Arg	Asp	Leu	Gln	Lys	His	Gly		
	1250				1255						1260						
Phe	His	Thr	Met	Asn	Asn	Leu	His	Gly	Asp	Gly	Val	Ser	Glu	Arg	Ser		
1265					1270					1275					1280		
Gln	Ile	Asn	His	Ser	His	His	Gly	Asn	Arg	Gln	Asp	Arg	Gly	Gly	Asn		
				1285					1290					1295			
Ser	Gly	Asn	Val	Leu	Asn	Met	Arg	Ser	Asn	Asn	Asn	Asn	Phe	Asn	Asn		
			1300					1305					1310				
Ile	Pro	Ser	Arg	Tyr	Asn	Leu	Tyr	Asp	Lys	Lys	Leu	Asp	Leu	Asp	Leu		
		1315					1320					1325					
Tyr	Glu	Asn	Arg	Asn	Asp	Ser	Thr	Thr	Lys	Glu	Leu	Ile	Lys	Lys	Leu		
	1330				1335						1340						
Ala	Glu	Ile	Asn	Lys	Cys	Glu	Asn	Glu	Ile	Ser	Val	Lys	Tyr	Cys	Asp		
1345					1350					1355					1360		
His	Met	Ile	His	Glu	Glu	Ile	Pro	Leu	Lys	Thr	Cys	Thr	Lys	Glu	Lys		
				1365					1370					1375			
Thr	Arg	Asn	Leu	Cys	Cys	Ala	Val	Ser	Asp	Tyr	Cys	Met	Ser	Tyr	Phe		
			1380					1385					1390				
Thr	Tyr	Asp	Ser	Glu	Glu	Tyr	Tyr	Asn	Cys	Thr	Lys	Arg	Glu	Phe	Asp		
	1395						1400					1405					
Asp	Pro	Ser	Tyr	Thr	Cys	Phe	Arg	Lys	Glu	Ala	Phe	Ser					
	1410					1415					1420						